REMARKS

Favorable reconsideration of this application is respectfully requested in view of the previous amendments and the following remarks.

Before discussing the subject matter recited in the claims of this application and as a preface to commenting on the issues raised in the most recent Official Action, the following general overview is provided of features and operational characteristics associated with a tube connecting apparatus according to at least one embodiment described and illustrated in the present application.

The apparatus includes a first clamp 6 having a locking mechanism constituted by a hook section 300. The hook section 300 has a plate piece 28 which is fixed pivotably to a tip of a covering body 24 through a hinge 27. A shaft 19 which protrudes toward a side of the second clamp 7 from an end face of the plate piece 28 is fitted to the plate piece 28.

The apparatus also includes a second clamp 7 disposed at a side of the first clamp 6 and adjacent to the first clamp 6. A long hole 40 into which the shaft 19 can be inserted is formed at an end face of the plate piece 38 facing a side of the first clamp 6. The long hole 40 is configured to allow the shaft 19 to move within the long hole 40 while the first clamp 6 moves in a tube connecting operation which changes the relative positions of the tubes clamped by the first clamp 6 and the second clamp 7.

Turning now to the claims, Claim 8, the only independent claim is rejected as being unpatentable over U.S. Patent No. 4,619,642, hereinafter Spencer '642, in view of various secondary references, including U.S. Patent No. 4,516,971, hereinafter Spencer '971.

Claim 8 recites a tube connecting apparatus wherein, *inter alia*, the first holding section has a shaft which protrudes from an end face disposed at a side of the second holding section of the movable clamp section, and the second holding section has a long hole formed at a side of the first holding section of the movable clamp section and into which the shaft is inserted.

Spencer '642 discloses an apparatus for making a sterile connection between tubes. The apparatus utilizes mounting blocks 180 and 182 which include covers 185 and 186 pivotally attached at hinge points 190 and 192 to tube holder bases 183 and 184. Slots 183a and 183b are provided in mounting block 180 and slots 184a and 184b are provided in mounting block 182 for holding the tubes to be spliced. At the inside facing ends of slots 183a, 183b and 184a, 184b are jaws 193 and 194, respectively. Jaw 193 has flat surfaces 193a and 193b and jaw 194 has flat surfaces 194a and 194b for flattening the tubes when the upper and lower halves of each mounting block are closed. Cover 186 of mounting block 182 has a corresponding jaw 196 with flat surfaces 196a and 196b for cooperating with flat surfaces 194a and 194b. Cover 185 is similarly equipped.

Inside surfaces of covers 185 and 186 are flat. Covers 185 and 186 have pivoting cam portions 185c and 186c, respectively, which fit over rollers 183d and 184d of bases 183 and 184 when the covers are closed to create sufficient force to flatten the tubing. Pivoting cam portion 186c is held in an up-position about its pivot by friction created by a spring washer inserted in pivot hinge 188. Pivoting cam portion 185c is similarly configured. When closing of the mounting blocks is initiated and the flattening jaws of the covers contact the tubes, covers 185 and 186 no longer pivot freely so that cam portions 185c and 186c begin to pivot and engage on

rollers 183d and 184d of bases 183 and 184. As the pivoting cam surfaces 185d and 186d engage the rollers, they pull the cover jaws down against the tubes causing the tubes to flatten against lower jaws 193 and 194. When cam portions 185c and 186c are fully pivoted, the tubes are completely flattened and the rollers fully engaged to maintain mounting blocks 180 and 182 closed.

Spencer '642's FIG. 7 depicts the mechanism for generating the five orthogonal motions required for splicing. The mechanism includes three cams to accomplish the five motions. The cams are grooves 78, 80 and 82 on different faces of cam cylinder 72. This arrangement ensures that the three cams are never out of phase. A cutting element holder 87 for cutting means 34 is pivotally attached to housing 62 at one end and is engaged in cam groove 78 at its other end. The cutting means 34 and heating wire 99, are positioned between mounting blocks 180 and 182 and below the tubes 66a and 68a held side-by-side in the blocks for splicing. A pivoting block 86 is journaled in housing 62 at one end and journaled to mounting block 180 at its other end. Mounting block 180 intermediate to its ends is engaged in cam groove 82. Mounting block 180 is also engaged in peripheral cam groove 80 via follower 67 while mounting block 182 is fixed to housing 62. Motor 74 rotates cam cylinder 72.

The five orthogonal motions involving mounting block 180, the cutting means 34 and heating wire 99 are: (1) urging the cutting means 34 through the tubes 66a and 68a, (2) separating cut tube ends, (3) shifting the tubes to align the ones to be joined together, (4) positioning the heating wire 99 to transmit heat for sterilization and melting to the tube ends, and (5) urging the tubes together.

FIG. 8 depicts cam cylinder 72 rotating in the direction of the arrow and, with this rotation, cam groove 78 lifting the cutting means 34 upwardly through the tubes 66a and 68a. The cut tube ends are then separated by cam groove 80 moving mounting block 180 away from mounting block 182. The tubes to be joined are then aligned by cam groove 82 moving block 180. The heating wire 99 is then positioned by cam groove 78 to effect sterilization/melting and subsequently removed. Continued rotation of the cam cylinder causes peripheral cam groove 80 to urge mounting block 180 toward fixed mounting block 182. Thus, tubes 66a and 68a which are each temporarily sealed are pushed together forming a sterile connection between them. The tubes are removed from the blocks and squeezed to break the temporary seals, thereby effecting fluid communication therethrough.

From the above, it is quite clear that, in the Spencer '642 device, the mounting block 182 is stationary, while movement of the mounting block 180 is precisely controlled by its engagement with the rotating cam cylinder 72.

The Official Action correctly notes that there is no shaft/hole engagement between the mounting blocks 180 and 182 of the Spencer '642 apparatus, but takes the position that it would have been obvious, in view of the disclosure in Spencer '971, to include such a shaft/hole engagement "in order to keep the blocks in a cooperative relationship". Applicants respectfully disagree.

Spencer '971 discloses a sterile docking apparatus in which a handle 29 attached to a block 18 is arranged to be manually pushed. While the handle 29 is pushed, the blocks 17 and 18 move together by virtue of engagement of the pin 36 with the cavity 35, until block 17 strikes the stop block 28. As the handle 29

continues to be pushed, the pin 36 and the cavity 35 disengage and block 18 continues to move without block 17.

By contrast, as explained in detail above, in the Spencer '642 device, the mounting block 182 is always stationary, while movement of the mounting block 180 is precisely controlled by its engagement with a rotating cam cylinder 72. Clearly, they never move together, and their relative movements are already precisely controlled by the cam arrangement. Thus, an ordinarily skilled artisan would have seen no reason to link their movement together by adding Spencer '971's cavity 35/pin 36 arrangement to Spencer '642's mounting blocks 180 and 182.

Claim 8 is therefore clearly allowable over the applied prior art, and withdrawal of the rejection of Claim 8 is respectfully requested.

The dependent claims are allowable at least by virtue of their dependence from allowable independent claims. The dependent claims also recite further distinguishing aspects of the tube connecting apparatus at issue here. For example, new Claim 15 recites that the shaft and the long hole, when engaged, allow movement of the holding unit by the movement unit to change relatively the positions of the tubes. By contrast, even assuming some basis exists for the proposed combination of the two Spencer devices, the pin 36 and the cavity 35, when engaged, would prevent any such relative movement.

Early and favorable consideration of this application is respectfully requested

Should any questions arise in connection with this application or should the Examiner believe that a telephone conference with the undersigned would be helpful in resolving any remaining issues pertaining to this application the undersigned respectfully requests that he be contacted at the number indicated below.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.20(d) and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Respectfully submitted,

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